

ABSTRACT

A method for performing a single-qubit gate on an arbitrary quantum state.

5 An ancillary qubit is set to an initial state $|I\rangle$. The data qubit is coupled to an ancillary qubit. The state of the ancillary qubit is measured, and the data qubit and the ancillary qubit are coupled for a first period of time. A method for applying a single-qubit gate to an arbitrary quantum state. A state of a first and second ancillary qubit are set to an entangled initial state $|I\rangle$. A state of a data qubit and the first ancillary qubit are measured thereby potentially performing a single qubit operation on the arbitrary
10 quantum state. A first result is determined. The first result indicates whether the single qubit operation applied the single qubit gate to the arbitrary quantum state.